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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/884,718	06/18/2001	Edward T. Grochowski	42390.P4900D	3593

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06/30/2004

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EXAMINER

TREAT, WILLIAM M

ART UNIT

PAPER NUMBER

2183

DATE MAILED: 06/30/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/884,718

Applicant(s)

GROCHOWSKI ET AL.

Examiner

William M. Treat

Art Unit

2183

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 18 June 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 15-20 is/are rejected.
- 7) ☒ Claim(s) 13 and 14 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 June 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 1.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

1. Claims 1-20 are presented for examination.
2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-3, 5-12 and 15-20 are rejected under 35 U.S.C. 102(b) as being anticipated by August et al. (Architectural Support...).
4. August taught the invention of exemplary claim 1 including a method of executing a sequence of instructions comprising determining a predicted predicate value for a predicate and conditionally executing a predicated instruction depending on the predicted predicate value (sections 3, 3.1, 3.2, 3.3, 3.3.1, and 3.3.2).
5. As to claim 2, August specifically taught executing a compare instruction to determine an actual predicate value (paragraph 3 of section 2) and inherently would compare the actual predicate value with the predicted predicate value when the actual is known to determine if the incorrect results and instructions must be flushed (i.e., removed) from the pipeline (Fig. 3) when the two do not match. Otherwise, his processor would produce incorrect results and his pipeline would ultimately be clogged by irrelevant instructions which weren't flushed even from the writeback stage of his pipeline.
6. As to claim 3, a branch incorrectly predicted to fall through by the predicate prediction process of August (paragraph 4 of section 1) would inherently have to be executed correctly after the pipeline was flushed, or August's system would not correctly execute program code.

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7. As to claim 5, August taught updating historical information data using the actual predicate value corresponding to the predicate in a predicate table (section 3.3.2).

8. As to claim 6, August taught storing the predicted predicate value in a file after determining a predicted predicate value and before conditionally executing the predicated instruction (4<sup>th</sup> sentence, 2<sup>nd</sup> paragraph of section 3.3.1).

9. As to claim 7, August taught determining the predicted predicate value includes calculating the predicted predicate value using historical information corresponding to the predicate (1<sup>st</sup> paragraph of section 3.3.1).

10. As to claim 8, August taught determining the predicted predicate value includes reading the historical information corresponding to the predicate in a predicate table (section 3.3.2).

August does not name his elements as applicants have, but the identified elements have the same function as those being claimed.

11. As to claims 9 and 10, August taught using the predicted predicate value in execution of the predicated instruction and when any predicated instructions predicate value (predicted or actual) is true for the condition or conditions specified, the predicated instruction executes, and when it is not true, the instruction is treated as a no-op (i.e., the instruction does not affect the architectural state of the computer) (1<sup>st</sup> paragraph of section 3.2 and 2<sup>nd</sup> sentence, 3<sup>rd</sup> paragraph of section 3.1).

12. As to claim 11, August taught a processor comprising a predicate table (Fig. 6, labeled PEP-PAs-BTB) and a predicate prediction calculator (Fig. 6, labeled True Hist, False Hist, P, Hist. Table, and what is obviously a multiplexer) and having an input into its Hist. Table component of the calculator which is an output of the predicate table/(PEP-PAs-BTB).

Applicants may note that components of the predicate table and predicate prediction calculator, as defined by the examiner's interpretation of the August reference, overlap. However, applicant's claim language is sufficiently vague as to permit such an interpretation.

13. As to claim 12, August taught a speculative predicate register file (Fig. 6, labeled Pred. Reg, File) having an input coupled to an output of the calculator (Fig. 6, output of P).

14. As to claim 15, August taught a predicate table (Fig. 6, labeled PEP-PAs-BTB or Fig. 4, labeled POP BTB) to store historical information corresponding to the predicate (section 3.3.2 or section 3.2) and a pipeline (Fig. 1(a)) coupled to the table, the pipeline to receive a predicted predicate value calculated from the historical information and to conditionally execute a predicated instruction depending on the predicted predicate value (section 3.1, last line of 2<sup>nd</sup> paragraph and section 3.3.2-Fig. 6 or section 3.2-Fig. 4). Note that the examiner considers it inherent that the predicate prediction will be received by the instruction pipeline, or August's system would not work. Also, when the simpler predictor of Fig. 4 is used the history is merely the record made the first time a branch is mispredicted (section 3.2, first paragraph) and the calculation performed is a table look-up using that historical record.

15. As to claim 16, August taught a predicate prediction calculator (Fig. 6, labeled True Hist, False Hist, P, Hist. Table, and what is obviously a multiplexer) to calculate the predicted predicate value. When the simpler predictor of Fig. 4 is used the history is merely the record made the first time a branch is mispredicted (section 3.2, first paragraph) and the calculation performed is a table look-up using that historical record.

16. As to claim 17, August taught a speculative predicate register file (Labeled Pred. Reg, File in both Figs. 4 and 6) to store the predicted predicate value.

17. As to claim 18, the examiner considers an output of the pipeline to provide the value of the actual predicate to the predicate table to be inherent in August's system. Otherwise, he could not properly update the counter mechanisms found in Fig. 6.

18. As to claim 19, see paragraph 5, *supra*.

19. As to claim 20, August taught the predicate table storing historical information corresponding to a plurality of predicates (see paragraph 14, *supra*, and the plurality of entries shown in those tables).

20. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

21. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

22. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over August et al. (Architectural Support...).

23. August taught the invention of claims 1 and 2 from which claim 4 depends (paragraphs 4 and 5, *supra*). However, while he inherently taught flushing of his pipeline, he did not teach flushing only the front-end portion of his pipeline. The examiner takes Official Notice of the fact that flushing of the front end of a pipeline to purge instructions resulting from prediction of an incorrect path is a conventional technique in the art. One of ordinary skill is motivated to use such a technique to simplify the flushing control mechanism. The examiner would also note that applicant's disclosure merely shows a box for their pipeline providing no implementation details as to what constitutes the front-end of their pipeline and how it is flushed. Obviously, they are depending on the skills of one of ordinary skill to know how to implement such a conventional element of their system.

24. Claims 13 and 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

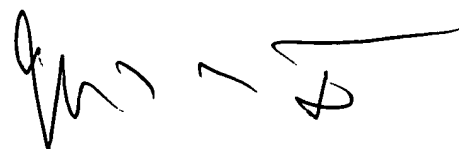
25. Any inquiry concerning this communication should be directed to William M. Treat at telephone number 703 305 9699. The examiner works at home on Wednesdays but may normally be reached on Wednesdays by leaving a voice message using his office phone number. The examiner also works a flexible schedule but may normally be reached in the afternoon and evening on three of the four remaining weekdays.

26. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

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system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'W. M. Treat', with a long horizontal line extending to the right.

**WILLIAM M. TREAT  
PRIMARY EXAMINER**